Intel EtherExpress™ PRO/100+ TX PCI

Model B

LAN Adapter

Installation Guide

intel.

Notices

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Introduction

The OnBoard Ethernet Controller (OBEC) is an Intel 82558 ethernet controller device and may be detected by software as either and Intel EtherExpress PRO/100+ or an Intel 82558 ethernet controller.

The OBEC may be enabled or disabled through the BIOS Setup utility. If you need to change the setting, refer to the system documentation for instructions on running the BIOS Setup utility.

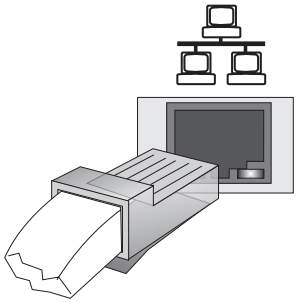
Connect the Network Cable

To Connect the Network Cable

1. Connect a single network cable to the ethernet port as shown below. For 100BASE-TX, your network cable must be Category 5, twisted-pair wiring. If you plan to run the controller at 100 Mbps, it must be connected to a 100BASE-TX hub or switch (not a 100BASE-T4 hub). For 10BASE-T, use Category 3, 4, or 5 twisted-pair wiring. If you want to use this controller in a residential environment, you must use a Category 5 cable.

Note:

For more information on 100BASE-TX wiring requirements and limitations, see "Fast Ethernet Wiring" on page 29 and refer to the readme files on the installation disk.



Twisted Pair Ethernet (TPE): Use Category 5 cable and an RJ-45 connector. Do not use Category 3 wiring at 100 Mbps. At 100 Mbps, connect to a TX hub, not a T4 hub. For full duplex, see "Select Duplex Mode (Optional)" on page 12.

Figure 1: 100BASE-TX Wiring

2. To configure the OBEC, continue with the procedures specific to your operating system on the following pages.

Configure the Controller and Install Drivers

Windows 95

Automatic Configuration

This PCI computer automatically detects and configures the onboard PCI-compliant ethernet controller. The BIOS automatically sets the controller's IRQ level and I/O address.

If your computer displays an error while booting, it may require additional steps to configure. See "PCI Installation Tips" on page 28 for more information.

Install Network Drivers from Diskette

Have your Windows 95 installation CD or disks available, as Windows 95 prompts for them when you enable the onboard ethernet.

Installing Network Drivers from Diskette

1. After you enable the onboard ethernet, start Windows 95. You'll see the New Hardware Found dialog box. If this box does not appear and Windows 95 starts normally, you may need to manually add the onboard ethernet controller. See "Manually Adding an OnBoard Ethernet Controller" on page 4.
2. Click "Driver from disk provided by hardware manufacturer," then click OK. You'll see the Install From Disk dialog box.
3. Insert the Configuration and Drivers disk.
4. Specify `A:\` (or `B:\`) as the path, then click OK.
5. Follow prompts for any Windows 95 installation disks and restart when prompted. (If you installed from the CD, the installation files are typically located at D:\Win95, where D is your CD-ROM drive.)

After restarting Windows 95, connect to your network by double-clicking the Network Neighborhood icon on the desktop.

Install the PROSet Software (Optional)

PROSet is an enhanced utility you can use to easily configure and test your OBEC in Windows 95. PROSet also displays the computer resources that are assigned to each adapter you install.

To Install PROSet

1. Insert the Configuration and Drivers disk in the disk drive.
2. From My Computer or the Windows Explorer, double-click the 3½ Floppy disk icon.
3. Click the PROSet icon or filename and click the right mouse button. From the menu that appears, click Install.
4. The PROSet files are copied to your hard disk.
5. To start PROSet, double-click on the PROSet icon in the Control Panel
6. The PROSet software examines your computer and displays the main window.
7. Click OK to exit PROSet and return to Windows 95.

Manually Adding an OnBoard Ethernet Controller

If the New Hardware Found dialog box does not appear at startup and you cannot connect to the network, check the Device Manager list to see if the new adapter is present.

Manually Adding the OBEC

1. From the Control Panel, double-click the System icon.
2. Click the Device Manager tab.
3. Double-click Other Devices (question mark icon) in the list area.
4. Double-click PCI Ethernet Controller.
5. Click the Driver tab, then click Change Driver.

6. Select Network Adapters and click OK.
7. Click Have Disk. Insert the Configuration and Drivers disk and click OK.
8. Follow any prompts for Windows 95 installation disks and restart when prompted.

Troubleshooting

If you can't connect to a server or if Windows 95 reports an error after you double-click Network Neighborhood, try the suggestions here first, then turn to *Troubleshooting and FAQs* on page 21 if necessary.

- Make sure you're using the drivers that are on the drivers diskette that ships with this system.
- Make sure the driver is loaded and the protocols are bound. Check Device Properties list for trouble indicators (an X or ! symbol).
- Test the controller. Start PROSet and click Test to run diagnostics.
- Check with your LAN administrator — you may need to install additional networking software.

Windows NT Server or Workstation

Automatic Configuration

This PCI computer automatically detects and configures the PCI-compliant OBEC. The OBEC IRQ level and I/O address are automatically set by the BIOS.

Start your computer to automatically configure the ethernet controller. Configuration is complete when Windows NT starts or the DOS prompt appears.

If your computer displays an error while booting, it may require additional steps to configure. See "PCI Installation Tips" on page 28 for more information.

Install Network Drivers - Windows NT Version 4.0 Only

After enabling the ehternet controller in the computer and starting Windows NT, you need to install the correct drivers.

Installing Windows NT 4.0 Drivers

1. Double-click the Network icon in the Control Panel.
2. Click the Adapters tab.
3. Click Add. You'll see a list of adapters.
4. Don't select an adapter from this list. Instead, insert the Configuration and Drivers disk into your floppy drive and click Have Disk.
5. Type `A:\` in the dialog box and click OK. Then follow the instructions to install the drivers. When the controller is added, you'll see its name listed in the Network adapters list. If you've installed multiple PRO/100+ adapters, all are configured at this time.
6. Select the controller and click Properties to run PROSet and view the controller configuration. Controller hardware diagnostics are available only when the drivers aren't loaded (before you restart your computer). Driver diagnostics are available when the drivers are loaded.

   PROSet is an enhanced utility that you can use to easily configure and test your ethernet controller in Windows NT. PROSet also displays the computer resources that were assigned to each adapter installed.
7. Click OK in the main PROSet window to return to Windows NT.
8. The controller now appears as the 82558-based 10/100 Ethernet Adapter on the list in the Network window. Click Close to finish.
9. Restart Windows NT when prompted.

Note:

To run the PROSet utility at any time, go to the Adapters tab in the Network control panel and click Properties.

Install Network Drivers - Windows NT Version 3.51 Only

After enabling the OBEC in the computer and starting Windows NT, you need to install the correct drivers and test the controller.

Installing the Windows NT 3.51 Drivers

1. Double-click the Network icon in the Control Panel.
2. Click Add Adapter.
3. When the list of adapters appears, scroll to the end of the list and select

   <Other> Requires disk from manufacturer.
4. Insert the Configuration and Drivers disk in the drive and click OK. Drivers and the PROSet utility are installed and PROSet starts.

   PROSet is an enhanced utility that you can use to easily configure and test your controller in Windows NT. PROSet also displays the computer resources that were assigned to each adapter installed. The PROSet main window is shown on the preceding page.
5. Click OK in the PROSet main window to return to Windows NT. You'll see the Network Settings dialog box.
6. Click OK and remove the installation disk. When prompted, restart Windows NT.

   To install multiple adapters, repeat this procedure for each new adapter. For more information, see "Installing Multiple Adapters" on page 11.

Troubleshooting

If Windows NT reports an error or you can't connect to the network, try the suggestions here first, then turn to "Troubleshooting and FAQs" on page 24 if necessary.

- Make sure that you use the drivers for this controller. Drivers are located on the Configuration and Drivers disk, version 3.0 or later.
- Make sure the driver is loaded and the protocols are bound. Check the Network Bindings dialog box in Windows NT.

- Check the Windows NT Event Viewer for error messages.
- If you are attaching to a NetWare network, check your frame type and verify that NetWare client software has been installed.
- Test the controller with PROSet. After installing the controller you can run PROSet from your hard disk. To do this, double-click the PROSet icon in the Control Panel. Click Test to run diagnostics. For additional information, click Help in the PROSet window.
- Check with your LAN administrator — you may need to install supplemental networking software.

DOS and Windows 3.1 Setup for Novell NetWare Clients

Note:

Windows 95 and Windows NT users: refer to the previous sections on Windows 95 and Windows NT. NetWare Client 32 users: refer to the NetWare readme files.

Automatic Configuration

This PCI computer automatically detects and configures the onboard PCI-compliant ethernet controller. The BIOS sets the controller's IRQ level and I/O memory address automatically.

Start your computer to automatically configure the OBEC. Resource configuration is complete when the DOS prompt appears. You can now continue with the procedure below.

If your computer displays an error while booting, it may require additional steps to configure a PCI adapter. See "PCI Installation Tips" on page 28 for more information.

Run Setup to Install Network Drivers

Setup can automatically install NetWare DOS ODI client drivers for you or display a readme file with installation instructions for other NOS drivers.

Installing NetWare/DOS Drivers

1. If your computer already has network drivers installed, restart the computer without loading them. If the drivers are loaded from the AUTOEXEC.BAT or CONFIG.SYS file, type REM in front of each line that loads a network driver. Or, with DOS 6.x or later press **F5** as DOS starts, to bypass the drivers.

2. Insert the Configuration and Drivers disk in a floppy drive, switch to that drive, and at the DOS prompt, type

   SETUP ENTER

3. If you have more than one PCI adapter in your computer, an adapter selection menu appears on the screen. Select the adapter you want by noting the Ethernet address. See "Installing Multiple Adapters" on page 11 for more information on multiple adapters.

4. Select Automatic Setup from the Main menu. Then follow the instructions on the screen. (If you want to test the adapter with a responder on the network, see the next procedure.)

   Setup displays the adapter's configuration and then runs a series of diagnostic tests that make sure the adapter and network are functioning properly. If Setup finds a problem, it displays the results and some possible solutions.

5. When Setup finishes the tests, you'll see the Install Network Drivers screen.

6. Select the driver you want to install. Setup can install a NetWare client driver for you. If you want to install other drivers, Setup displays a readme file with installation instructions.

Troubleshooting

If you can't connect to a server, first try the suggestions here, then turn to "Troubleshooting and FAQs" on page 24.

- Make sure you're using the drivers for this controller. The driver filename contains the letter B (for example, E100BODI.COM).
- If you're replacing an existing adapter, make sure the LINK statement in your NET.CFG is correct for the new adapter. For example, the LINK statement for a NetWare client is:
  LINK DRIVER E100BODI
- Verify that the frame type in your NET.CFG file matches your network.
- If setting up a server, check your LOAD and BIND statements.

- Test the adapter by running diagnostics in Setup. Additional testing is available by using a responder (see the next section).
- Check the readme files.

Responder Testing on the Network (Optional)

Setup can test the OBEC more thoroughly if there is a responder on the network while you run the tests.

Testing with a Responder on the Network

1. Go to a computer on the network with a comparable PCI adapter installed.
2. Run the appropriate configuration program for the installed adapter and set it up as a responder.
3. Return to the computer with the new adapter. Run Setup and test the adapter.

NetWare Server, Client 32, UNIX, OS/2, Banyan, and Other Operating Systems

Refer to Intel's online documents. On a DOS computer, view the appropriate readme file for information on installing your network driver.

1. To view the readme files, insert the Configuration and Drivers disk into a drive, switch to that drive, and type:

   SETUP /README ENTER

Refer to *Installing Adapter Drivers* for the operating system you need.

Installing Multiple Adapters

All users: The system's 12-digit, hexadecimal Ethernet address is printed on a sticker placed on the system board. The Ethernet address is sometimes called the node address or the MAC address. Note that the onboard PCI ethernet controller shares the PCI interrupt with PCI slot 1 (primary) and PCI slot 7 (secondary).

NetWare users: The server drivers use the PCI slot number to identify each installed adapter. You can correlate the PCI slot number to the adapter by using the Ethernet address that is printed on a label on the adapter. Run Setup from the Intel disk to view the Ethernet address and slot number for each installed adapter. For more information, see the readme files. NetWare 4.11 server installations use unique slot numbers that are assigned during server setup.

Windows 95 and Windows NT 3.51 users: Repeat the configuration procedure for each adapter you want to install.

Select Duplex Mode (Optional)

Duplexing is a performance option that lets you choose how the ethernet controller sends and receives data packets over the network. The ethernet controller can operate at full duplex only when connected to a full duplex 10BASE-T, 100BASE-TX switch, or another full duplex adapter.

- Auto (requires a full duplex adapter or switch with auto-negotiation capability). The controller negotiates with the switch to send and receive packets at the highest rate. This is the default setting. If the switch does not provide auto-negotiation, the controller runs at half duplex.
- Full duplex (requires a full duplex switch or adapter). The controller can send and receive packets at the same time. This mode can increase controller performance capability. If the full duplex switch provides auto-negotiation, the controller runs at full duplex. If the full duplex switch does not provide auto-negotiation, you need to set the controller duplex mode manually (see following paragraphs), because it defaults to half duplex.
- Half duplex. The controller performs one operation at a time; it either sends or receives.

Note:

If your controller is running at 100 Mbps and half duplex, your potential bandwidth is higher than if you run it at 10 Mbps and full duplex.

Manually Configuring for Full Duplex

If your switch supports auto-negotiation with the N-way standard, duplex configuration is automatic and no action is required on your part. However, few switches in the current installed base support auto-negotiation. Check with your network system administrator to verify whether your switch supports this feature. Most installations will require manual configuration to change to full duplex.

Note:

Controller performance may suffer or your controller may not operate if your switch doesn't support full duplex and you configure the controller to full duplex. Make sure you always set the speed when you configure duplex.

Configuration is specific to the driver you're loading for your network operating system (NOS).

To set up the duplex mode, refer to the section below that corresponds to your operating system.

DOS ODI, NDIS 2.01 Clients

Edit the NET.CFG or PROTOCOL.INI file. Add these keywords to the Link Driver section:

```
FORCEDUPLEX 2
SPEED 100   (or 10 if 10BASE-T)
```

NetWare Server

In AUTOEXEC.NCF, load E100B.LAN and add the following statement (you must include the equal sign for servers):

```
FORCEDUPLEX=2 SPEED=100
(or 10 if 10BASE-T)
```

For more information, see the readme file for NetWare servers.

Windows NT

While running Windows NT:

1. From the Control Panel, double-click the Networking icon. Select the controller and click on Properties.
2. PROSet examines your system and displays the Controller Setup window.

   If you have multiple adapters, click the Show All Adapters box and then select the adapter you are configuring (you can identify it by its Ethernet address). Each adapter must be configured separately. For more information, refer to *Installing Multiple Adapters* on page 11.
3. From the window that appears, click Settings. You'll see the Adapter Setup window.
4. Click the menu for Network Speed.
5. Click 100 or 10 Mbps, depending on switch speed.
6. Click the menu for Duplex Mode.
7. Click Full.
8. Click OK.
9. Click Restart Windows NT.

Windows 95

While running Windows 95:

1. In the Control Panel, double-click the System icon.
2. Go to the Device Manager tab and select the controller.
3. Click Properties, then click OK to use the setup program (PROSet).
4. PROSet examines your system and displays the Adapter Setup window. If you have multiple adapters, click the adapter you are configuring (you can identify it by its Ethernet address). Each adapter must be configured separately. For more information, refer to *Installing Multiple Adapters* on page 11.
5. Click Settings and then Advanced.
6. In the Duplex Mode list box, choose Full.
7. Click OK and restart Windows 95.

Other Operating Systems

See the *Adapter Installation and Special Configurations* readme file. Instructions for viewing readme files are on the inside front cover of this book.

Choose Ethernet Controller Teaming Options

The onboard PRO/100+ ethernet controller provides several options for increasing throughput and fault tolerance when running Windows NT 4.0 or NetWare 4.1x or newer:

- Adapter Fault Tolerance **(AFT)** - provides automatic redundancy for your controller. If the primary controller fails, the secondary takes over.
- Adaptive Load Balancing (ALB) - creates a team of two, three, or four adapters to increase transmission throughput. Also includes the AFT option. Works with any 100BASE-TX switch.
- Fast EtherChannel (FEC) - creates a team of two to four adapters to increase transmission and reception throughput. Also includes the AFT option. Requires a Cisco switch with FEC capability.

To set up an option, go to the appropriate section in the pages that follow.

Note:

One or more Intel PRO/100+ PCI ethernet adapters may be added to the system. These adapters work in conjunction with the onboard Intel PRO/100+ ethernet controller to achieve the enhancements sdescribed in this section.

The onboard ethernet controller is refered to as the primary controller throughout. When the statement refers to either the onboard controller or an adapter, the term adapter is used.

General Configuration Notes

- Adapter Teaming options are supported by Windows NT versions 4.0 and later .
- Adapter Teaming options require NT 4.0 with Service Pack 3.0 and the NDIS driver hotfix from Microsoft. See the *Late Breaking News* for details.

Setting Up Adapter Fault Tolerance Only

Adapter Fault Tolerance provides the safety of an additional backup link between the server and hub or switch. In the case of hub or switch port, cable, or controller failure, you can maintain uninterrupted network performance.

Adapter Fault Tolerance is implemented with a primary controller and a backup, or secondary, adapter. During normal operation, the backup adapter will have transmit disabled. If the link to the primary controller fails, the link to the secondary adapter automatically takes over.

Note:

Use this procedure to set up AFT only. If setting up ALB or FEC, use the procedures in the next sections. The AFT feature runs automatically when you enable ALB or FEC.

Note:

For more information about Adapter Fault Tolerance, see the Adapter Fault Tolerance readme files on the Configuration and Drivers disk.

To use Adapter Fault Tolerance, you must have at least two PRO/100+ adapters installed in your Windows NT 4.0 or NetWare 4.x workstation or server and they must be linked to the same network.

Setting up Adapter Fault Tolerance in Windows NT 4.0

Setting up AFT in Windows NT 4.0

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select a PRO/100+ adapter that will be in the team and click Properties.
3. Click Adapter Teaming in the PROSet window.
4. Click OK when prompted. You'll see the Adapter Teaming Configuration window.
5. Follow the instructions for assigning adapters to a team. Adapter Fault Tolerance supports up to four adapter teams, two adapters per team.
6. Select AFT Only in the Team Function area.
7. Click OK and then click Close to finish. When prompted, restart your computer.

Deleting a Team

Deleting a Team

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select the AFT team to delete.
3. Click Remove. A confirmation dialog appears. Click Yes.
4. Click Close. Restart when prompted.

Setting up Adapter Fault Tolerance in NetWare

Setting up AFT in NetWare

1. Copy the following lines from the EXAMPLES.TXT file (on the Configuration and Drivers disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory of your workstation. (Files must be copied from the Configuration and Drivers disk to your workstation's hard drive).

   Adapter Fault Tolerance must be loaded before the PRO/100+ controller driver, `E100B.LAN,` or any other LAN driver.

   Copy this line into the STARTUP.NCF file

   ```
   ;- Load Adapter Fault Tolerance
   load aft
   ```

   Copy these lines into the AUTOEXEC.NCF file

   ```
   ;- Load LAN driver on 1st controller
   load e100b slot=7 frame=ethernet_802.2
   name=pri_802.2

   ;- Load LAN driver on 2nd adapter
   load e100b slot=8 frame=ethernet_802.2
   name=sec_802.2

   ;- Bind ipx to 1st controller. Note: do not bind
   protocols ;- to 2nd adapter
   bind ipx pri_802.2 net=2

   ;- Set the 2nd adapter to be a Fault Tolerance Partner

   ;- to the first controller
   aft bind 7 8
   ```

   Where:

   `slot=` the slot in which your PRO/100+ adapter is installed, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with supported PCI slot numbers.

   `frame=` the frame type of the network segment the computer is on.

   `7` is the primary controller's slot number.

   `8` is the secondary adapter's slot number.

2. Modify the lines to match your workstation or server's requirements.
3. Save the STARTUP.NCF and AUTOEXEC.NCF files and restart your server.

Deleting a Team

To remove a team in AFT, ALB or FEC mode, edit out the lines above. Or, temporarily remove the team by issuing the unbind command with the slot number for the primary controller in the group.

Format: `AFT UNBIND SlotNumber`

Example: `AFT UNBIND 7`

Setting Up Adaptive Load Balancing

Adaptive Load Balancing (ALB) is a simple and efficient way to increase your server's transmit throughput. With ALB you group PRO/100+ adapters in teams to provide an increased transmit rate (up to 400 Mbps) using a maximum of four adapters. The ALB software continuously analyzes transmit loading on each adapter and balances the rate across the adapters as needed. Adapter teams configured for ALB also provide the benefits of AFT. Receive rates remain at 100 Mbps.

To use ALB, you must have two, three, or four PRO/100+ adapters configured as a team in your server or workstation and linked to the same network switch.

Setting up ALB in Windows NT 4.0

Setting up ALB in Windows NT 4.0

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select a PRO/100+ adapter that will be in the team and click Properties.
3. Click Adapter Teaming in the PROSet window.

4. Click OK when prompted. You'll see the Adapter Teaming Configuration window.
5. Follow the instructions to assign adapters to a team. ALB supports up to two adapter teams, with two, three, or four adapters per team.
6. Select Load Balancing in the Team Function area.
7. Click OK and then click Close to finish. When prompted, restart your computer.

Deleting a Team

Deleting a Team

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select the ALB team to delete.
3. Click Remove. A confirmation dialog appears. Click Yes.
4. Click Close. Restart when prompted.

Setting up ALB in NetWare

Setting up ALB in NetWare

1. Copy the following lines from the EXAMPLES.TXT file (on the Configuration and Drivers disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory of your workstation. (Files must be copied from the Configuration and Drivers disk to your workstation's hard drive).

   Copy this line into the STARTUP.NCF file

   ```
   ;- Load Adaptive Load Balancing
   load aft
   ```

Note:

Adaptive Load Balancing must be loaded before the PRO/100+ adapter driver, `E100B.LAN`, or any other LAN driver.

Copy these lines into the AUTOEXEC.NCF file

```
;- Load LAN driver on 1st controller
load e100b slot=7 frame=ethernet_802.2
name=pri_802.2

;- Load LAN driver on 2nd adapter
load e100b slot=8 frame=ethernet_802.2
name=sec_802.2

;- Bind ipx to 1st controller
bind ipx pri_802.2 net=2

;- Set the 2nd adapter to be a Load Balancing
Partner to
;- the first controller

aft balance 7 8
```

Where:

`slot=` the slot your PRO/100+ adapter is installed in, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

`frame=` the frame type of the network segment the computer is on.

`7` is the primary controller's slot number.

`8` is the secondary adapter's slot number.

2. Modify the lines to match your workstation or server's requirements.
3. Save the AUTOEXEC.NCF and STARTUP.NCF files, and restart your workstation or server.

Deleting a Team

To remove a team in AFT, ALB or FEC mode, edit out the lines above, or temporarily remove the teams by issuing the unbind command with the slot number for the primary controller in the group.

Format: `AFT UNBIND SlotNumber`

Example: `AFT UNBIND  7`

Setting -Up Fast EtherChannel

Fast EtherChannel (FEC) is a performance technology developed by Cisco to increase your workstation or server's throughput. Unlike ALB, you can configure FEC to increase both transmission and reception channels between your workstation or server and switch. FEC works only with FEC-enabled Cisco switches, such as the Catalyst* 5000 series. With FEC, as you add adapters to your workstation or server, you can group them in teams to provide up to 800 Mpbs at full duplex, with a maximum of four PRO/100+ adapters. The FEC software continuously analyzes loading on each adapter and balances network traffic across the adapters as needed. Adapter teams configured for FEC also provide the benefits of AFT (see page 14).

To use FEC, you must have two or four PRO/100+ adapters configured as an FEC Team in your server or workstation and linked to the same FEC-enabled Cisco switch.

Setting up FEC in Windows NT 4.0

Setting up FEC in Windows NT 4.0

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select a PRO/100+ adapter that will be in the team and click Properties.
3. Click Adapter Teaming in the PROSet window.
4. Click OK when prompted. You'll see the Adapter Teaming Configuration window.
5. Follow the instructions for assigning adapters to a team. FEC supports up to two adapter teams, two or four adapters per team.
6. Select Fast EtherChannel in the Team Function area.
7. Click OK and then click Close to finish. When prompted, restart your computer.

Deleting a Team

Deleting a Team

1. Double-click the Network icon in the Control Panel.
2. On the Adapters tab, select the FEC team to delete.
3. Click Remove. You'll see a confirmation dialog. Click Yes.
4. Click Close. Restart when prompted.

Setting up FEC in NetWare

Setting up FEC in NetWare

Note:

Fast EtherChannel must be loaded before the PRO/100+ adapter driver, `E100B.LAN`, or any other LAN driver.

1. Copy the following lines from the EXAMPLES.TXT file (on the Configuration and Drivers disk) and paste them into the appropriate files. These commands assume the AFT.NLM and E100B.LAN files are in the system directory of your workstation. (Files must be copied from the Configuration and Drivers disk to your workstation's hard drive).

   Copy this line into the STARTUP.NCF file

   ```
   ;- Load Fast EtherChannel
   load aft
   ```

   Copy these lines into the AUTOEXEC.NCF file

   ```
   ;- Load LAN driver on 1st controller
   load e100b slot=7 frame=ethernet_802.2
   name=pri_802.2

   ;- Load LAN driver on 2nd adapter
   load e100b slot=8 frame=ethernet_802.2
   name=sec_802.2

   ;- Bind ipx to 1st controller
   bind ipx pri_802.2 net=2

   ;- Set the 2nd adapter to be a Fast EtherChannel Partner to

   ;- the first controller
   aft fec 7 8
   ```

Where:

`slot=` the slot in which your PRO/100+ adapter is installed, such as 7. If you don't know the number, load the driver without it. NetWare will prompt you with available PCI device numbers.

`frame=` the frame type of the network segment the computer is on.

`7` is the primary controller's slot number.

`8` is the secondary adapter's slot number.

2. Modify the lines to match your server's requirements.
3. Save the AUTOEXEC.NCF and STARTUP.NCF files, and restart your server.

Deleting a Team

To remove team in AFT, ALB or FEC mode, edit out the lines above. Or, temporarily remove the team by issuing the unbind command with the slot number for the primary controller in the group.

Format: `AFT UNBIND SlotNumber`

Example: `AFT UNBIND  7`

Troubleshooting and FAQs

If the OnBoard Ethernet Controller Can't Connect to the Network

Make Sure the Cable is Installed Properly

The network cable must be securely attached at both RJ-45 connections (controller and hub). The maximum allowable distance from controller to hub is 100 meters. If the cable is attached and the distance is within acceptable limits but the problem persists, try a different cable.

If you're directly connecting two computers (no hub), use a crossover cable. Most hubs require a straight-through cable, while most switches require a crossover cable (see your hub or switch documentation to verify).

See the *Cabling Information* readme file for more information on crossover cables.

Check the LED Lights on the Controller

The controller has two diagnostic LEDs above the cable connector. These lights help indicate if there's a problem with the connector, cable, or switch/hub. The table on the next page describes the LEDs.

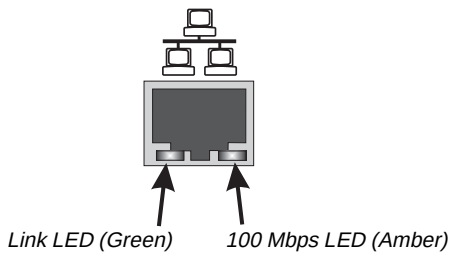


Figure 2: LAN Connector LEDs

LED	Indication	Meaning
LNK	On	The controller and switch are receiving power; the cable connection between the switch and controller is good.
	Off	The controller and switch are not receiving power; the cable connection between the switch and controller is faulty; or you have a driver configuration problem.
100	On	Operating at 100 Mbps.
	Off	Operating at 10 Mbps.

Make Sure You are Using the Correct Drivers

Make sure you're using the drivers that come with this computer. The driver file name contains the letter B (for example, E100BODI.DOS). Drivers that support previous versions of the Intel PRO 10/100 controller do not support this version of the controller.

Make Sure the Switch Port and the Controller have the same Duplex Setting

If you configured the controller for full duplex, make sure the switch port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

Testing the Controller (Diagnostics)

Test the controller by running diagnostics. For DOS or Windows 3.1 computers, run Setup on the Configuration and Drivers disk. For Windows NT and Windows 95 run PROSet by double-clicking the PROSet icon in the Control Panel. Click Help from the main PROSet window to get complete diagnostics information and instructions.

Frequently Asked Questions (FAQs)

SETUP.EXE reports the controller is "Not enabled by BIOS".

- The PCI BIOS is not configuring the controller correctly. Try "PCI Installation Tips" on page 28.

The computer hangs when the drivers are loaded.

- Change the PCI BIOS interrupt settings. See "Technical Information" on page 28 for PCI installation tips.
- If you are using EMM386, it must be version 4.49 or newer (this version ships with MS-DOS* 6.22 or newer).

Diagnostics pass, but the connection fails or errors occur.

- At 100 Mbps use Category 5 wiring and make sure the network cable is securely attached.
- For NetWare clients, make sure you specify the correct frame type in your NET.CFG file.
- Make sure the duplex mode setting on the controller matches the setting on the switch.
- At 100 Mbps, connect to a 100BASE-TX hub/switch (not 100BASE-T4).

The LNK LED doesn't light.

- Make sure you've loaded the network drivers.
- Check all connections at the controller and the switch.
- Try another port on the switch.
- Make sure the duplex mode setting on the controller matches the setting on the switch.
- Make sure you have the correct type of cable between the controller and the hub. 100 BASE-TX requires two pairs. Some hubs require a crossover cable while others require a straight-through cable. See the *Cabling* readme file for more information on cabling.

The controller stopped working when another adapter was added to the computer.

- Make sure the cable is connected to the controller.
- Make sure your PCI BIOS is current. See “PCI Installation Tips” on page 28.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts — OS/2 doesn’t.
- Try reseating the most recently installed adapter.

The controller stopped working without apparent cause.

- Run the diagnostics.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.

Technical Information

PCI Installation Tips

PCI computers are designed to automatically configure add-in cards each time the computer starts. Your PCI computer sets the I/O address and IRQ level for your network controller when the computer starts. These values cannot be changed by Intel adapter software. If you experience a problem when the computer starts, additional configuration steps may be required.

On these computers, manual configuration is possible through the computer's PCI BIOS setup utility. Refer to your computer's documentation. You may need to verify or change some BIOS settings.

Some common PCI solutions are listed here.

- Busmaster-enabled slots. On some computers, all slots are not busmaster enabled by default. Check your BIOS PCI bus setting. It will be set to either Busmaster or Non-busmastered. Choose Busmaster.
- Reserve interrupts (IRQs) and/or memory addresses for ISA adapters. This prevents PCI cards from trying to use the same settings ISA cards are using. Check your PCI BIOS setup program. There may be IRQ options such as Enable for ISA, Reserve for ISA, or Disable for PCI.' This option is sometimes in the Plug and Play area of the BIOS setup.
- Enable the PCI slot. In some PCI computers, you must use the PCI BIOS setup program to enable the PCI slot. This is especially common in PCI computers with the PhoenixBIOS*.
- Update your PCI BIOS. An updated PCI system BIOS can correct some PCI configuration problems. Call your computer manufacturer to see if an updated BIOS version is available for your computer. Phone numbers for the top PCI computer manufacturers are listed in the *PCI Installation* readme file on the Configuration and Drivers disk.

- Configure the slot for level-triggered interrupts. The slot the controller is using must be configured for level-triggered interrupts rather than edge-triggered interrupts. Check your PCI BIOS Setup program.

Here are some example PCI BIOS setup program parameters:

PCI slot #:	Slot where the controller is installed
Master:	ENABLED
Slave:	ENABLED
Latency timer:	40
Interrupt:	Choose an IRQ from the list
Edge-level:	Level

The exact wording of these parameters varies with different computers.

"Push" Installation for Windows 95

If you are a LAN Administrator setting up server-based push installation of Windows 95 as defined in Microsoft Windows 95 Resource Kit, additional steps are required for this controller. Refer to the *Push Installation for Windows 95* readme file on the support web site (see the inside back cover).

Fast Ethernet Wiring

100BASE-TX Specification: The 100BASE-TX specification supports 100 Mbps transmission over two pairs of Category 5 twisted-pair Ethernet (TPE) wiring. One pair is for transmit operations and the other for receive operations. Segment lengths are limited to 100 meters with 100BASE-TX for signal timing reasons. This complies with the EIA 568 wiring standard.

Fast Ethernet Hubs and Switches

The two basic types of hubs are shared hubs (hubs) and switching hubs (switches). This controller can be used with either type of hub for 10 Mbps. At 100 Mbps, a TX hub or switch is required.

Shared hubs

In a shared network environment, computers are connected to hubs called repeaters. All ports of the repeater hub share a fixed amount of bandwidth, or data capacity. On a 100 Mbps shared hub, all nodes on the hub must share the 100 Mbps of bandwidth. As stations are added to the hub, the effective band-width available to any individual station gets smaller. Shared hubs do not support full duplex.

Think of a shared repeater hub as a single-lane highway that everyone shares. As the number of vehicles on the highway increases, the traffic becomes congested and transit time increases for individual cars.

On a shared hub all nodes must operate at the same speed, either 10 Mbps or 100 Mbps. Fast Ethernet repeaters provide 100 Mbps of available bandwidth, ten times more than what's available with a 10BASE-T repeater.

Repeaters use a well-established, uncomplicated design, making them highly cost effective for connecting PCs within a workgroup. These are the most common type of Ethernet hubs in the installed base.

Switching hubs

In a switched network environment, each port gets a fixed, dedicated amount of bandwidth. In the highway scenario, each car has its own lane on a multi-lane highway and there is no sharing.

In a switched environment, data is sent only to the port that leads to the proper destination station. Network bandwidth is not shared among all stations, and each new station added to the switch gets access to the full bandwidth of the network.

If a new user is added to a 100 Mbps switch, the new station receives its own dedicated 100 Mbps link and doesn't impact the 100 Mbps bandwidth of another station. Switches can effectively increase the overall bandwidth available on the network, significantly improving performance. Switches can also support full duplex.

For more information on Fast Ethernet, visit our Network Products web site at http://www.intel.com/network.

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